A REVISED SYNOPSIS OF THE PINES 2

THE AROLLA PINES

(PINUS, SECTION CEMBRA)

Pierre Landry
230 blvd. des Trembles, unit 2,
Hull, J9A 2H4, Canada

ABSTRACT

Section Cembra, here emended, is of 8 species with terminal umbos and wingless seeds (or seeds having a short, ineffective wing). It is subdivided into 3 subsections which have clear cut characters, without overlapping. The shape of the midcone scales is mainly considered; also the cespitosity of the plant (or its absence). The proposed treatment is quite practical, and classical.

SECTION CEMBRA EMEND.

Section Cembra Spach (1842, p. 398) is hereby emended to include only the Pinus species with a terminal umbo and wingless seeds, or seeds having a short, ineffective wing. We exclude the degree of dehiscence or indehiscence of the cones, because we cannot effectively observe it without taking great pains and lots of time . For example, over one century of botanizing had elapsed before it was found (by D.F. Tomback in 1980 or so; please read Critchfield, 1986, p. 648), that the cones of Pinus albicaulis are sometimes dehiscent. Other species - Pinus koraiensis, Pinus pumila - open partly their cones, and that is confusing. Finally many other species of Pinus look closed or nearly closed on the ground after pouring rains. They will become wide open after a dry spell of weather.

The characters that we use to subdivide this section are those of the cone scales and their umbos. We had considered the degree of reflexion of the apophysis but upon close study it was noticed that there was too much variation intraspecifically. For example the

apophysis of Pinus strobiformis are sometimes all strongly reflexed, and sometimes only half of them are reflexed. Those of Pinus koraiensis are reflexed or not. Etc.

KEY TO THE SUBSECTIONS

1. Midcone scales longer than wide, or rounded. Trees 2
   2. Apophysis thin (2-5mm). Umbo small, blunt to subacute, not prickling.....subsection Cembrae.
   22. Apophysis thick (6-7mm). Umbo salient, subacute to acute, prickling.....subsection Nucifragae.
11. Midcone scales wider than long. Shrubs.....subsection Coxinoides.

SUBSECTION CEMBRAE EMEND

First valid publication by Loudon (1838, p. 2274). He comprised only Pinus cembra. The synonyms of that subsection are listed in Little & Critchfield (1969, p. 8).

Our new emended description is given above by the words of the key (articles 1 and 2). It comprises 6 species:
Pinus cembra (type) (including P. sibirica), P. armandi (including P. dabeshanensis), P. fenzeliana, P. flexilis, P. koraiensis and P. strobiformis.

All are continental, except Pinus koraiensis and Pinus fenzeliana which are both continental and maritime.

Pinus sibirica is considered by me and by many others as a variety of Pinus cembra. I dare call it a "small" species or a "microspecies". In order to come to that conclusion, I obey to the principle of equity which stipulates that we call a taxon by the name of "microspecies" when it can be distinguished by fewer net morphological differences. In the case of taxon sibirica, only 2 net such differences have been found: 1) seeds with a fragile husk; 2) bud scales shining. I therefore propose that it be called var. sibirica Loudon (1838, p. 2275).

Pinus dabeshanensis Cheng & Law differs from Pinus armandi, according to its authors, mainly by the reflexed midcone scales. But the degree of reflexion

of cone scales in sections Cembra and Quinquefoliis often varies intraspecifically according to latitude and altitude. Please read further above, under the heading "Section Cembra emend".

We here again have the case of a "small" species which in all equity we cannot place in the same level as the "big" species.

"Pinus dabeshanensis Cheng & Law in Cheng et al. (1975, p. 85)" is the precise reference for further study of its rank.

Taxon dabeshanensis was first published in a great monograph of Chinese Conifers, wherein thank God many taxonomic problems were solved.

SUBSECTION NUCIFRAGAE

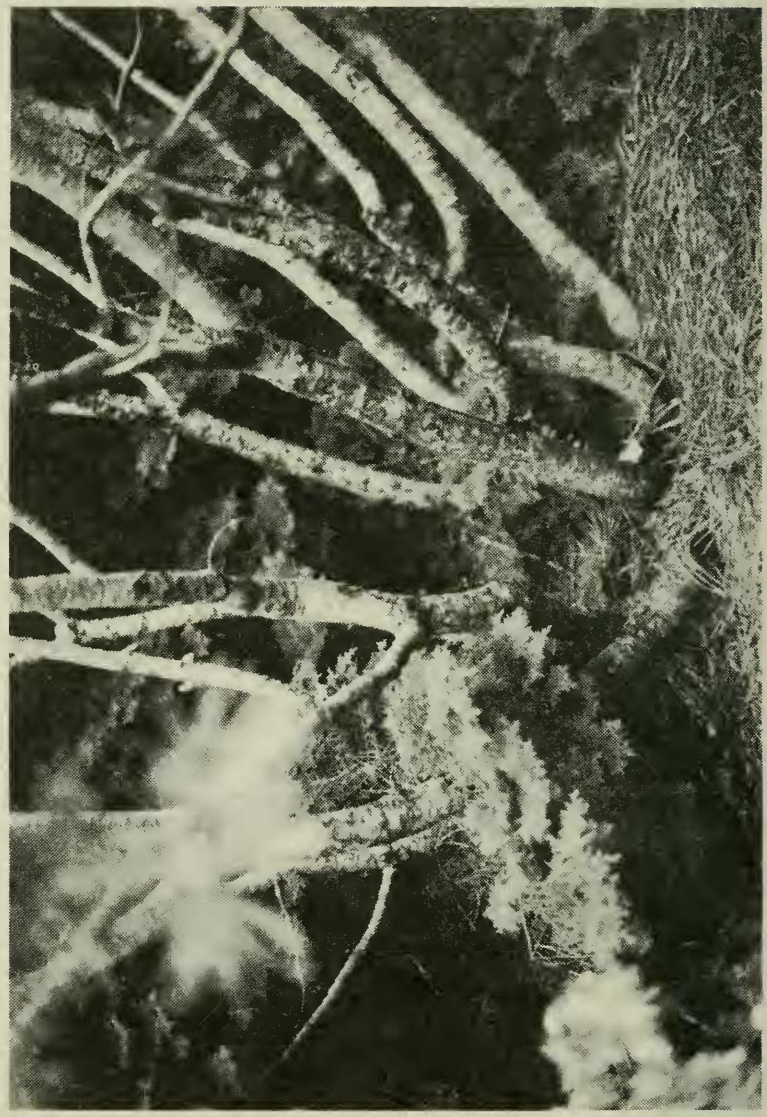
This new subsection comprises only Pinus albicaulis Engelmann. The cones of this species are peculiar by their subacute or acute umbos. When we grab the whole cone, our hand feels a bit prickled. By that trait, Pinus albicaulis can be slightly related to some of the species of subgenus Pinus (cones with dorsal, simple umbo).

Secondly, the midcone apophysis are much thicker (6-7mm) than those of the other species belonging to section Cembra.

Thirdly, it has been reported (Shaw, 1914, p. 28) that the seeds of that species have no spermoderm at all.

Fourthly, Weaver & Dale (1974, p. 227) inform us that it is often multi-trunked:"In half of the stands [surveyed in Montana] over half the trees had two or more stems. [...] Trees with five or more stems appear in two-thirds of the stands, but no tree with more than eleven stems were seen. The clumping may be due to branching at the base or, more likely, to the germination of several seeds in a cone or a squirrel cache". (The only other Pinus belonging to subgenus Strobus and which is more clumped is Pinus pumila. Please see photo of a 9-stemmed clump of Pinus pumila here under. Pinus pumila is near always cespitose).

Formal creation: subsection Nucifragae nov. s. Strobili umbone sub-mucronato. Apophysi crassa (6-7mm). Monotypus: Pinus albicaulis Engelmann.



That is a low tree (common height: 8-10m). Of all the Pines belonging to subgenus Strobus in America, it is the most cold resistant and the most northerly, reaching Latitude North 55°. Peculiarly, it grows only near the timberline of high altitude sites.

The subsection's name recalls that the Nucifraga birds "own" those Pines, together with the squirrels.

SUBSECTION COXINOIDES

Subsection Coxinoides nov. s.— Strobili squamis latiores et breviores. Arbusti coxinoides. Monotypus: Pinus pumila Regel.

This subsection is extraordinary. Its midcone scales are wider than long; it is the only species of the subgenus Strobus which has a shrubby habit. It often forms pure dense stands that are so thick as to be nearly impenetrable by human beings, partly due to its cespitose habit (photo).

Essentially a continental species, it occupies the record latitude amplitude of the genus Pinus (ranging from Latitude 35°30' in Japan to Latitude 70°45' in Siberia) totalling 35°15'. It is also the most northerly species of the genus Pinus (see Crithfield & Little, 1966) and by far the most cold resistant. The deadly winds coming from the Arctic regions do not attain him very much because of its low stature. It "sleeps" below the snow level during the hard winter months.

KNOWN NATURAL HYBRIDS

A natural hybrid should be called by a binomial (followed by a notomorph epithet if needed).

1- Pinus X parapumila Ishii n. sp. hybr. Arbustum ad media res Pinorum cembra et pumila. Canales distantiores. -Shrub intermediate between Pinus cembra and Pinus pumila. Resin canals longer distanced (than those of Pinus pumila).

Ishii (1952, p. 115) had forgotten to write his description in latin when he described that natural hybrid species.

2- Pinus X novaemexicana n. sp. hybr. Arbor ad media res Pinorum flexilis et strobiformis. Semina

alata breviorissima. -Tree intermediate between Pinus flexilis and Pinus strobiformis. Seeds with a very short wing (ineffective).

Most details about this natural hybrid species are furnished by Steinhoff & Andresen (1971), and Andresen & Steinhoff (1971) who did during the Sixties and the beginning of the Seventies an essential contribution to the knowledge of the Pines in U.S.A. and Mexico.

A synonym exists of this hybrid, according to what I conclude from the observations of Andresen & Steinhoff (1971, p. 59); here is what those authors write: "The cone scales of var. (macrocarpa) are intermediate between vars α and γ and are also intermediate within the clinal array of the P. flexilis-strobiformis complex of Arizona and New Mexico".

That synonym is Pinus flexilis var. macrocarpa Engelmann (1878, p. 258).

RECOGNITION

This paper is published to honor Seiji Ishii for his first order contribution to the knowledge of the genus Pinus since over 30 years. Ishii innovated in the classification of the genus Pinus by giving preponderance to the morphology of the seeds.

REFERENCES

Andresen, J.W. & R.J. Steinhoff (1971). The taxonomy of Pinus flexilis and P. strobiformis. Phytologia 22: 57-70.

Cheng, W.-C., L.-K. Fu and C.-Y. Cheng (1975). Gymnospermae Sinicae. Acta Phytotaxonomica Sinica 13: 56-90, +66 illustr. +17 pl.

Critchfield, W.B. (1986). Hybridization and Classification of the White Pines (Pinus section Strobus). Taxon 35: 647-656.

Critchfield, W.B. & E.L. Little (1966). Geographic Distribution of the Pines of the World. U.S. Dept. Agric. Misc. Pub. 991.

Englemann G. (1878). Coniferae of Wheeler's Expedition in Rept. Geological Surveys... by J.T. Rothrock. 6: 255-264.

Ishii, S. (1952). A Taxonomic Study of the Genus Pinus. Rep. Kôchi Univ. Nat. Science No.2: 103-127. (In Japanese, partly in English).

Landry, P. (1977). Taxinomie du sous-genre Strobus (genre Pinus): les sous-sections et les series. Bull. Soc. bot. Fr. 124: 469-474.

Little, E.L., Jr & W.B. Critchfield (1969). Subdivisions of the Genus Pinus (Pines). U.S. Dept. Agric. Misc. Pub. 1144.

Loudon, J.C. (1838). Arboretum et Fructicetum Britannicum. London.

Shaw, G.R. (1914). The Genus Pinus. Arnold Arboretum Pub. 5, 96p.

Spach, E. (1842). Histoire naturelle des végétaux phanérogames, vol. 2.

Steinhoff, R.J. & J.W. Andresen (1971). Geographic variation in Pinus flexilis and Pinus strobiformis and its bearing on their taxonomic status. Sylvae Geneticae 20:159-167.

Weaver, T. & D. Dale. (1974). Pinus albicaulis in Central Montana: Environment, Vegetation and Production. Am. Midland Nat. 92: 222-230.